

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

Order No. 84-36

WASTE DISCHARGE REQUIREMENTS FOR
SLUDGE STORAGE FACILITIES AND SLUDGE
APPLICATION TO DEDICATED LAND

NOVATO SANITARY DISTRICT
NOVATO, MARIN COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter Board) finds that:

1. Novato Sanitary District, hereinafter called the discharger, by application dated January 24, 1984, has applied for waste discharge requirements to dispose of their sewage sludge produced by the District's two sewage treatment facilities (Novator and Ignatio Plants) to a dedicated land.
2. The discharger operates two secondary sewage treatment plants (Novato and Ignatio) with effluent discharged through a combined outfall to San Pablo Bay. The sewage sludge is treated at these plants by anaerobic digestion. Digested sludge is stored and thickened in sludge lagoons. The discharger is currently in the process of expanding the treatment and disposal facilities to include effluent irrigation on nearby pasture areas. The discharger proposes to dispose the thickened sludge (10 to 12 percent dry solid concentration) from the lagoons on 14.4 acres of dedicated land. The dedicated disposal area is located adjacent to and Northeast of effluent storage pond No. 2 in Novato as shown in Attachment A, which is Incorporated Herein and made part of this Order. The proposed land application of sewage sludge will commence upon completion (in early 1985) of the expansion of the existing treatment facilities. At that time the sludge production is projected to be about 650 tons per year. The annual application will increase to about 1440 tons per year by year 1991. This total includes 400 tons per year of alum sludge from North Marin County Water District.
3. The proposed Dedicated Land Disposal Area and Sludge Storage Lagoons are underlain by blue-gray silty clay known as soft bay mud. This soil is very impervious (permeability is less than 10^{-6} cm/sec) and extends to depths of 20 to 65 feet below the existing ground surface. The perimeter dikes will be keyed to the underlying bay mud and compacted to 90 percent compaction, in order to prevent lateral migration of shallow saline groundwater.
4. No useable groundwater exists beneath the site. The shallow underlying groundwaters are of poor brackish quality and rises within a foot of the ground surface during wet months. The nearest surface water is Novato Creek located about one-half mile west of the disposal area.

5. The digested sludge will be removed to the proposed lagoons system where it will be thickened from about 1.5 percent solids to 5 percent and then to about 12 percent in a two step process. After the sludge has been thickened it will be applied during summer months (May to October) to the proposed dedicated land disposal area either by injection or by surface application. Runoff from the disposal areas will be pumped back to the treatment plant. All the sludge lagoons and the dedicated land disposal will be designed to withstand a 100 year flood.
6. The discharger has analyzed their sludge according to State Department of Health Services procedures for Waste extraction and found the sludge to be non hazardous.
7. Subchapter 15, Chapter 3, Title 23, of the California Administrative Code, Waste Disposal to Land, classifies the non hazardous sewage sludges as group 2 wastes which may be disposed at a class II-2 Landfill.
8. The land within 1000 feet of this site is used for agricultural purposes.
9. The discharger has submitted a technical report prepared by a registered Civil Engineer, dated January 24, 1984 which describes proposed site characteristics, sludge application and site management.
10. The Regional Board adopted a revised Water Quality Control Plan for the San Francisco Bay Region (Basin Plan) on July 21, 1982. The Basin Plan contains water quality objectives for Novato Creek and San Pablo Bay.
11. The beneficial uses of San Pablo and Novato Creek in the vicinity of the discharge as contained in the Basin Plan are:
 - a. Fish migration
 - b. Fish spawning
 - c. Wildlife habitat
 - d. Preservation of rare and endangered species
 - e. Cold freshwater habitat for fish
 - f. Warm freshwater habitat for fish
 - g. Navigation
 - h. Water contact recreation
 - i. Non-contact water recreation
 - j. Industrial water supply
 - k. Esthetic enjoyment
12. The discharger has prepared a Final Environmental Impact Report and Environmental Impact Statement "Eastern Marin-Southern Sonoma Wastewater Management Plan" dated June 1979, in accordance with the California Environmental Quality Act (Public Resource Code Section 2100, et. seq.).

13. The project proposed by the discharger may have the following potential effects on the environment as described in the Environmental Impact Report.
 1. Odors from the sludge lagoons and the landspreading area.
14. The discharger has provided the following mitigation measures to reduce odors: 1) locating the lagoons as far away from populated area as possible 2) pumping sludge into lagoons during late night hours and 3) minimizing disposal operations during windy conditions.
15. No special protection of the groundwater was recommended in the Environmental Impact Report (EIR). The shallow groundwater in the proposed disposal areas is too acidic and saline to be of any use. The construction of the dikes around the disposal areas will prevent any lateral migration of the pollutants from the proposed site and all runoff from the proposed dedicated land disposal will be pumped to the treatment plant. Consequently, there will be no adverse impact on Novato Creek and beneficial uses of Waters of the State.
16. The discharger has certified and the Boards finds that all local agencies with jurisdiction have approved use of the site for the intended purposes.
17. The Board finds that the potential adverse impacts on beneficial uses stemming from the discharger's project as described in Finding 13, have been mitigated by measures incorporated into the proposed project design or required by this Order.
18. This Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written comments and recommendations.
19. The Board in a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED pursuant to provisions of the California Water Code and regulation adopted thereunder, that the discharger shall comply with the following:

A. Prohibitions

1. Sewage sludge disposed of at the storage lagoons and dedicated land shall be limited to digested sewage sludge generated by the discharger unless an exception is authorized in writing by the Executive Officer.
2. No sewage sludge that contains contaminants in concentration in excess of thresholds defined in the Environmental Protection Agency's Hazardous Waste List and California Assessment Manual shall be disposed of in the Dedicated Land Disposal area.

3. Sewage sludge shall not be applied to the Dedicated Land Disposal area between October 30 and May 1 unless prior written authorization is obtained from the Executive Officer.
4. Discharge of any liquid waste or contaminated runoff to any surface waters or drainage course is prohibited.

B. Specifications for Sludge Lagoons

1. The treatment and disposal of sewage sludge shall not cause a condition of pollution nor nuisance as defined by Section 13050(m) of the California Code.
2. No sewage sludge shall be stored outside the designated storage lagoons as shown in Attachment A.
3. The storage lagoons shall be protected from any washout or erosion of wastes and from inundation which could occur as a result of floods having a predicted frequency of once in 100 years.
4. Hydraulic continuity with underlying groundwater shall be prevented by the presence of a natural clay barrier with a permeability of 10^{-6} cm/sec or less on the bottom and sides of disposal areas.
5. There shall be no overflow from the storage lagoons.
6. A minimum freeboard of 2 feet shall be maintained in the sludge lagoons at all times.
7. Poned water or runoff from the storage area's shall not be discharged to the adjacent lands or ditches.

C. Specification for Dedicated Land Dispsal Area

1. Neither transport, handling and application of sewage sludge shall cause pollution or a nuisance as defined in Section 13050(m) of the California Code.
2. Sludge shall be spread thinly and disced into soil to minimize odor problems and wind erosion of sludge to surface waters.
3. No sludge shall be disposed outside the designated area as shown on the Attachment A.
4. The perimeter drainage ditches and other drainage facilities shall be maintained to convey the maximum anticipated rainfall runoff from the site to prevent inundation of the site.
5. All abandoned wells located within the disposal area shall be sealed to the satisfaction of the Marin County Department of Health Services and the California Department of Health Services.

6. The disposal area(s) shall be protected from any washout or erosion of wastes and from inundation, which could occur as a result of floods having a predicted frequency of once in 100 years.
7. The discharger shall design, construct, operate and maintain, transformation, and immobilization of sewage sludge in the treatment zone.
8. Ponded water or runoff from the disposal area shall not be discharged to adjacent land or ditches.

Provisions

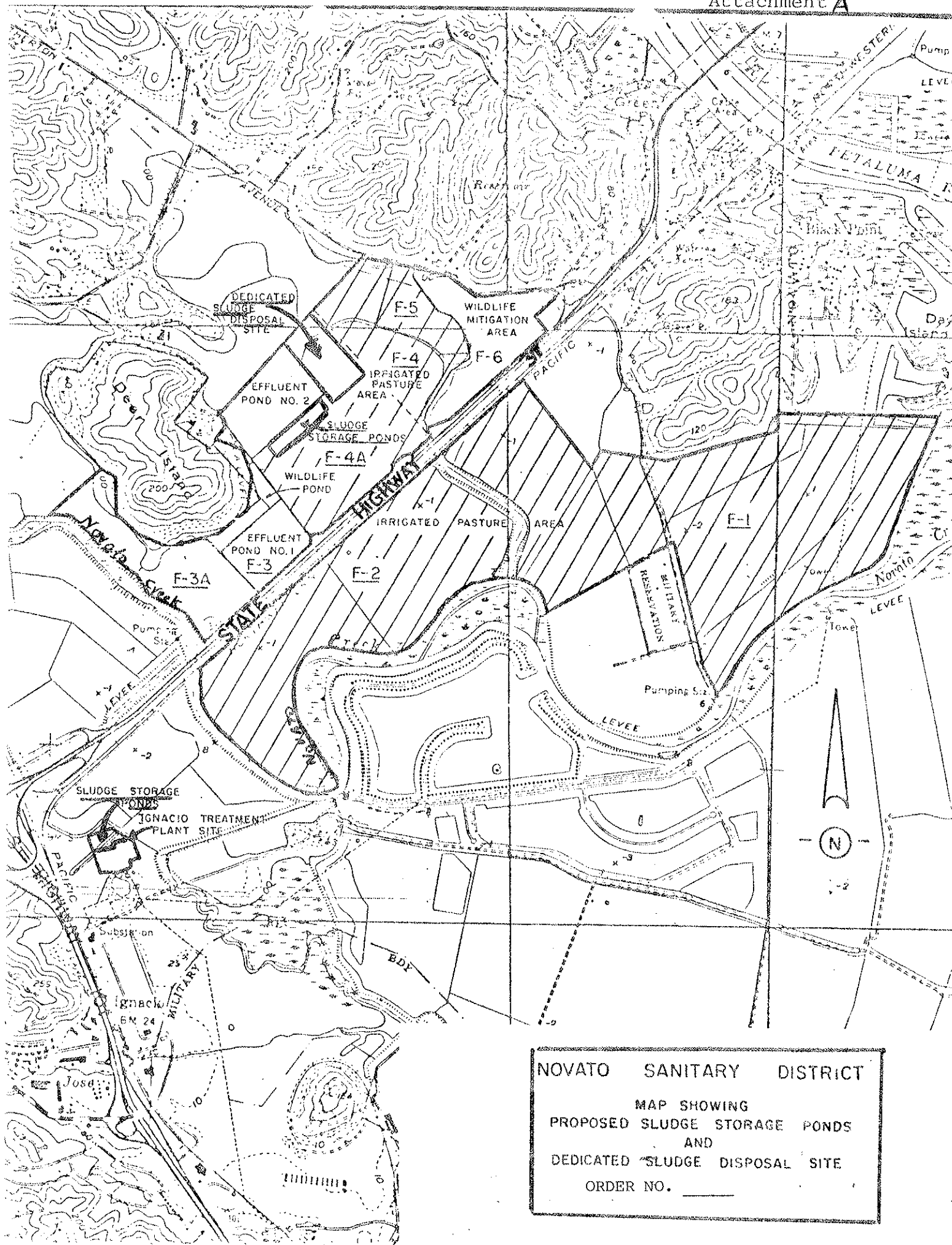
1. The discharger shall comply with all specifications and Prohibitions of this Order immediately upon adoption.
2. Disposal of sewage sludge to disposal areas shall not commence until it is determined by a technical report prepared by a Registered Civil Engineer that all measures necessary to meet the waste discharge specification of this Order have been met.
3. The discharger shall file with the Regional Board technical reports on self-monitoring work performed according to detailed specifications as directed by the Executive Officer.
4. The discharger shall file with this Board a report of any material change or proposed change in the character, treatment, or volume of this waste discharge. For the purpose of these requirements, this includes any proposed change in the boundaries, or ownership of the property.
5. The discharger shall permit the Board or its authorized representatives in accordance with California Water Code Section 13267(c):
 - a. Entry upon premises in which an effluent source is located or which any required records are kept;
 - b. Access to copy any records required to be kept under terms and conditions of this Order;
 - c. Inspection of monitoring equipment or records; and
 - d. Sampling of discharge, soil or agricultural crop
6. These requirements do not exempt the operator of this waste disposal facility from compliance with any other laws, regulations, or ordinances which may be applicable; they do not legalize this waste disposal facility, and they leave unaffected any further restraint on the disposal of wastes at this site which may be contained in other statutes or required by other agencies.

7. In accordance with Section 13263 of the Water Code, these requirements are subject to periodic review and revision by this Regional Board. The Board shall take into consideration the results of the self-monitoring program whenever these periodic reviews occur.
8. Six months prior to discontinuing the use of dedicated land disposal area for waste disposal the discharger shall submit a technical report to the Board describing the methods and controls to be used to assure protection of the quality of surface and groundwaters and prevent erosion of the area during final operations and with any proposed subsequent use of the land. This report shall be prepared by or under the supervision of a certified engineering geologist or registered civil engineer. The method used to close the site and maintain protection of the quality of surface and groundwaters shall comply with waste discharge requirements established by the Board.

I, Roger B. James, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on June 20, 1984.

ROGER B. JAMES
Executive Officer

Attachments:
A. Site Map



NOVATO SANITARY DISTRICT

MAP SHOWING
PROPOSED SLUDGE STORAGE PONDS
AND
DEDICATED SLUDGE DISPOSAL SITE

ORDER NO. _____

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM
FOR

NOVATO SANITARY DISTRICT

SLUDGE STORAGE FACILITIES AND SLUDGE

APPLICATION TO DEDICATED LAND DISPOSAL SITE

ORDER NO. 84-36

I. GENERAL

1. All analyzes shall be performed by an approved (certified laboratory using generally acceptable methods or current EPA/State guidelines procedures for sampling and analyses of sludge, soil, and groundwater.
2. The sludge, soil, groundwater, and shall be submitted in accordance with the specifications described in this program. Any failures to conform to this program of sampling and analyses shall be explained in the subsequent report.

II. REPORTING

Reporting to the Board shall normally be accomplished by the submission of a single annual report. This report shall be prepared by, or under the supervision of, a soil scientist, soils engineer, or other individual having a recognized expertise on the impacts of sewage sludge on soils and on surface and groundwaters. The annual report shall be submitted no later than May 15 of each year, and shall include the following:

A. Annual Management Plan Update

This section shall describe the method of operation for the upcoming season and include the following as a minimum:

1. Sludge loading rate to be used, expressed in dry weight per unit area as kg/ha.
2. Method proposed for incorporating sludge into soil.

Where applicable, the management plan update should indicate changes to past practices that have been identified as being needed in the subsequent portion of the report.

B. Report on Impact of Previous Sludge Applications

The overall intent of this section is to provide a comprehensive annual assessment of the project. This section shall include data presentation and a narrative evaluation of the sludge applied to the land, and of the impacts on soils, and groundwater below the site. Where problems are found to exist, proposed solutions shall be included.

3. Groundwater

Present data on groundwater expressed in mg/l. All relevant parameters shall be compared with the background level and values in excess shall be discussed.

III. SAMPLING AND ANALYSIS

A. Sludge

1. During the period in which sludge is applied to the land directly from the sludge lagoon(s), sampling and analyses shall be performed bi-monthly over five consecutive days as follows:

- a. Samples shall be taken from each truck load leaving the plant or withdrawing from the lagoons. Trucks hauling Novato Plant sludge shall be sampled and composited separately from trucks hauling Ignacio Plant sludge. The Novato and Ignacio sludge samples shall be analyzed separately.

- b. Equal volumes of the daily composites shall be combined into a five day composite. The 5-day composite shall be analyzed for the following:

pH, Percent Solids, Total Nitrogen, Ammonium Nitrogen, Nitrate Nitrogen, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Silver, Zinc, and PCB's.

All concentrations shall be expressed on a dry weight basis.

If PCB's concentration is less than 5 mg/kg then it shall be analyzed once a year.

2. In case sludge is withdrawn directly from the digesters to be applied directly to the land disposal site, each truck load shall be sampled, composited and analyzed as indicated in Section III 1.a. and III 1.b.

3. For the analyses given above

- a. Except for pH and percent solids, all parameters shall be expressed in dry weight basis (i.e. mg/kg).

1. Sludge

Present data on sludge composition on dry weight basis. All data shall be presented, and any anomalies found shall be discussed. Any significant changes from previous analyses shall be discussed.

2. Soils

For the Dedicated Land Site, the following table shall be completed based on the most recent data obtained:

Last date sampled_____

<u>Parameter</u>	<u>Prior</u> <u>Cumulative</u> <u>Soil Concentration, mg/kg</u>			
	<u>Loading</u>	<u>0-12"</u>	<u>12-24"</u>	<u>24-36"</u>
Sludge added as				
dry solid %				
Nitrogen				
Ammonium				
Nitrate				
TKN				
Arsenic				
Cadmium				
Chromium				
Copper				
Lead				
Nickel				
Mercury				
Silver				
Zinc				
PCB's				
pH				
Cation Exchange				
Capacity				

The data presented above shall be evaluated and discussed. This discussion shall also include the degree to which the sludge has been incorporated into soils at various depths (data may be useful in this assessment), and whether the project has had any effects on soil texture or workability.

Any changes in soil pH shall be described, together with probable reasons.

- b. If PCB concentration in lagoons is less than 10 mg/kg then monthly analyses is not needed.
 - c. An analytical sensitivity for heavy metals of 0.1 mg/l shall be adequate.
4. Records on sludge produced, stored and disposed shall be maintained on a yearly basis.

B. Soils

1. Annual Testing

- a. Two diagonal transects shall be established for the disposal site. Each year prior to sludge application, a minimum of five (5) soil samples, spaced equidistantly shall be taken along each transect at 0 to 12 inches depth range. Soil sample shall be composited and analyzed for the following parameters:

pH, Lead, and Zinc

- b. A map showing the sample location shall be provided.

2. Comprehensive Testing

- a. Comprehensive testing shall be done prior to sludge application to define conditions that prevailed prior to the commencement of this monitoring program. After this initial testing, testing shall be conducted each time that approximately 90 dry tons of sludge per acre has been applied.
- b. For the disposal site to be sampled, two diagonal transects shall be established. Along each transect, and spaced equidistantly, a minimum of ten soil samples shall be taken at each depth.

Soil samples shall be taken for three depths: zero to twelve inches; twelve to twenty-four inches; and twenty-four to thirty-six inches. Soil samples from each depth (twenty samples per depth) shall be composited and analyzed for the parameters specified below.

c. Analyses

<u>Parameter</u>	<u>Unit</u>
pH	pH unit
CEC(2)	meq/100gm
Electric Conductivity	Millimhos/cm at 25°C
Texture(2)	
Ammonium-Nitrogen	mg/kg
Nitrate-Nitrogen	mg/kg
TKN	mg/kg
Arsenic	mg/kg
Cadmium	mg/kg
Chromium	mg/kg
Copper	mg/kg
Nickel	mg/kg
Lead	mg/kg
Zinc	mg/kg
PCB(1)	mg/kg

(1) PCB shall be analyzed only when the sludge concentration exceeds 5 mg/kg.

(2) To be analyzed only once to obtain background information in order to determine the variability in the field.

C. Groundwater

1. Sampling Stations

<u>Stations</u>	<u>Location</u>
<u>Ignacio Plant</u>	
GI-1	Located outside of the north westerly, dike of the disposal site and within 5 feet of the dike.
GI-2	Located outside of the north easterly dike of disposal site.
<u>Novato Plant</u>	
GR-1	Located at southwesterly corner of the sludge lagoons dike.

<u>Stations</u>	<u>Location</u>
<u>Novato Plant</u>	
GR-2	Located at southerly corner of the sludge lagoon dike.
GR-3	Located at southeasterly corner of the dedicated land disposal site.
GR-4	Located at northerly corner of the dedicated land.
GC-1	Control well located at the end of access road into wildlife mitigation area.

(See attached map on approximate locations of the monitoring wells).

The depth of these "G" wells shall be as deep as is necessary to reach the water table. Wells shall be constructed so as to exclude surface runoff.

2. Analyses

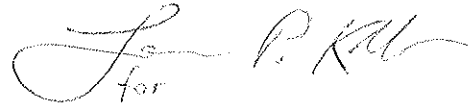
<u>Parameter</u>	<u>Unit</u>
Depth to water	ft.
pH	pH unit
Conductivity	mhos/cm at 25°C
Chloride	mg/l
Cadmium	mg/l
Chromium	mg/l
Copper	mg/l
Nickel	mg/l
Lead	mg/l
Zinc	mg/l
Arsenic	mg/l

NOTE: Standing water in each well shall be flushed prior to taking samples.

3. All stations shall be sampled two times a year, in March and October.

I, Roger B. James, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Regional Board's Resolution No. 73-16 in order to obtain data and document compliance with sludge disposal specifications established in the Board Order No. 84-36.
2. Is effective on the date shown below.
3. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger, and revisions will be ordered by the Executive Officer.

A handwritten signature in dark ink, appearing to read "R. B. James", with a large, stylized initial "J" or "R" on the left.

for
ROGER B. JAMES
Executive Officer

Attachment: Map of the Dedicated Land and Sludge
Disposal Sites with sampling location(s)